SPECIES LIFE HISTORY AND HABITAT REQUIREMENTS

CHUKAR PARTRIDGE

BLM MANUAL Technical Supplement 6601-2
Supersedes Rel. 6-10

Rel. 6-21
11/2/70

Form 1221-2
(June 1969)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MANUAL TRANSMITTAL SHEET

Release	
6-21	
Date	
11/2/70	

Subject

6601 - SPECIES LIFE HISTORY AND HABITAT REQUIREMENTS
Technical Supplement 6601-2, Chukar Partridge

1. Explanation of Material Transmitted: This release replaces Appendix 1, Release 6-10, and is reissued as Technical Supplement, 6601-2, which covers the Chukar Partridge life history and habitat requirements.

2. Reports Required: None

3. Material Superseded: Manual pages superseded by this release are listed under "Remove" below.

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CHUKAR PARTRIDGE

A. Importance. The chukar partridge is an "exotic" or non-native game bird first introduced into the United States in 1893. Major efforts to establish the bird, however, started in the 1930's and continued until the early 1960's. Chukars are native to the arid mountainous regions of central and southern Europe and Asia. More than one race of chukars have been liberated, but the Indian variety Alectoris graeca chukar is probably the ancestor of most birds established in North America. The first U. S. hunting season was held in Nevada in 1947 and, since that first season, chukars have become the most important upland game bird in that state. Hunting seasons have now been held in 10 western states and Hawaii: Montana, Wyoming, Arizona, Colorado, Utah, California, Oregon, Washington, Idaho, Nevada.

B. Distribution. Chukars have been released in at least 40 states but have become established only in the western states generally from the Rocky Mountain area westward. Chukars have become established in the states mentioned above and appear to have a fair chance in New Mexico.

C. Habitat. The chukar is a bird of the arid, rough mountainous country. The habitat usually consists of steep rugged canyons with numerous talus slopes and rocky outcrops. Scattered juniper (Juniperus spp.) and sagebrush (Artemisia tridentata) are often characteristic plants along with bitterbrush (Purshia tridentata), Indian tea (Ephedra sp.), snakeweed (Gutierrezia sp.), rabbitbrush (Chrysothamnus sp.), cheatgrass (Bromus tectorum), foxtail chess (Bromus rubens) and other grasses. Cheatgrass usually makes up the bulk of the grassy cover. Chukars seem to thrive in areas of 5" to 10" of annual precipitation and have been observed from below sea level in Death Valley to 12,000 feet elevation in the mountains.

Galbreath (Reference #5) describes optimum habitat in Washington as a mixture of sagebrush, cheatgrass, bunchgrass and rock in about the following proportions: 50% sage-cheatgrass-bunchgrass; 45% talus slopes, rock outcroppings, cliffs and bluffs; and 5% brushy creek bottoms and swales.

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D. Life History. The annual cycle of a chukar population in southeastern Washington was outlined by Mackie and Buechner (Reference #7).

Birds in flocks	-	July to February
Pair formation	-	Early February to March
Male breeding	-	Mid March to mid May
Nesting	-	Late April to mid May
Egg laying period	-	Mid March to mid June
Hatch	-	May 10 to July
Brood season	-	Mid May to September

This cyclic sequence would apply to other areas; however, the time of the various activities would vary depending on altitude and geographic area.

1. Courtship and Breeding. Chukars were originally considered monogamous, that is, breeding limited to a single male and female, but recent research suggests one male may breed more than one female. Winter flock breakup and pairing takes place from early February to April, depending on the geographic area. At the time of pairing, the male chukar shows an intolerance for chukars other than the mate, and this trait results in widespread dispersion. The initiation of the breeding season is controlled by day length and weather. The pair bond lasts until early into the incubation period.

2. Nesting begins in late April or May, again depending on the area. Nests are usually well hidden under vegetation or rocky outcrops and are often located on steep slopes. Nests are merely depressions in the ground resembling a dusting bowl and are lined with dry grass or small twigs and breast feathers. Harper et al. (Reference #6) found in California that of 205 chukars, both adults and young, observed between the period from April to June (nesting season), 184 were within one-half mile of water. In another California study during the same period, of 112 chukars observed, 104 were within one-half mile of water. A clutch of about 11 or 12 eggs is laid, and hatching usually occurs in May or June. The incubation period is 21 to 22 days. Broods as large as 17 chicks have been observed, but the average is 10 to 12 per hen. There is no indication of more than one nesting per pair, but, if the first nest is broken up or destroyed early in incubation, a second nesting attempt will be made.

3. Rearing of Young. Chukars, like other gallinaceous game birds, have precocial young that leave the nest almost immediately after hatching. The young are fast afoot and proficient at hiding within a few hours after hatching. The young do not attempt to fly until about two weeks of age and, at this age, can fly from 30 to 50 feet..

4. Productivity. Chukar populations have shown very large fluctuations in numbers from year to year. In Nevada large numbers of chukars were available to hunters in 1951 and 1952. Food production, mainly annual grasses, in both 1951 and 1952 was excellent as a result of ample fall and spring precipitation. Water was generally available for the birds. In the winter 1952-53 there was very little precipitation, and the early part of the nesting season was cold. The inclement spring was followed by a severe and prolonged summer drought. Plant production was very long and chukar brood production was nil. Both food and water for chukars were short and the chukar population drastically declined. This drastic change from high to low numbers must be considered as a normal, even though infrequent, event in the long term history of a game bird population. Numbers of chukars increased again when adequate food, water and cover became available.

E. Migration and Movements. Chukars do not migrate in the sense of the north-south movements of mourning dove and waterfowl populations, but in some areas there is an altitudinal migration or movement. In the early fall birds tend to move to lower altitudes toward cultivated fields. After annual grasses germinate and green up, the birds move back up into the hill country. Heavy snows also move chukars to lower elevations and the birds move back up as the snow recedes.

F. Cover Requirements.

1. Nesting Cover. Preferred nesting cover usually includes brush and rocky outcrops on slopes of moderate to steep hillsides. Nests are generally well hidden and located in or under vegetative cover. In Washington, Galbreath (Reference #5) found nests 300 to 400 feet up slopes away from creek bottoms and dense sagebrush areas. Often the nests were built near the base of a decumbent sagebrush plant.

2. Feeding Cover. Feeding cover is dependent on food availability and usually consists of cheatgrass, Russian thistle, alfalfa, or other annual grasses and weeds. Chukars apparently need rocky outcrops or talus slopes adjacent to feeding areas for escape cover from predators.

3. Dusting Cover. Chukars dust frequently, and dusting bowls are often located alongside trails, in the shelter of shrubs, and near the base of rock outcrops. During spring and summer the dusting bowls are usually close to watering sites.

4. Roosting Cover. Preferred roosting sites vary. In Nevada, roosts are generally in the shelter of rock outcrops or steep talus slopes and beneath sagebrush and juniper trees. In Washington, summer roosting cover consists of open spots of talus slopes and winter roosting cover in protected niches and caves on the faces of rocky cliffs. In general, chukars do not seek heavy vegetative cover for roosting.

G. Food Habits.

1. Feeding Behavior. Chukar feeding activity is greatest in mid-morning and afternoon. During hot, dry summers feeding is usually close to water. Throughout the breeding season, pairs are frequently observed feeding; this is in contrast to covey type feeding at other seasons. Chukars use their bills extensively in food gathering, and the soil is often disturbed in the search for seeds, grass shoots and bulbs and insect larvae and eggs. Chukars are able to dig through crusted snow to considerable depth in search of food.

2. Food Requirements. Chukars are omnivorous feeders eating grain, weed seeds, fruits, berries, and a variety of leafy green food. Grasses, including stems, blades, and seeds are the major food items in most areas, with seeds of annual and perennials second in importance. Chukars also take animal foods, primarily insects such as grasshoppers, beetles, crickets, and ants. Alfalfa leaves are highly preferred food in areas where agriculture lands are adjacent to range inhabited by chukars. The condensed findings of selected food habit studies from California, Nevada and Washington follow.

Harper et al. (Reference #6) in California found, "Crops from 87 chukars in the Inyo-Mono area were examined and 91 food items were found, with Russian thistle heading the list. Grasses ranked second in the chukars' diet in that area. In 42 crops from chukars in the Temblor area, 52 separate food items were found, with red-stemmed filaree first and fiddle-neck second in importance."

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In Nevada, Christensen (Reference #3) found the seasonal food habits listed below:

Winter - Grass blades composed the bulk of the diet, as well as small amounts of cheatgrass and red-stem filaree seeds.

Spring - Food primarily rough fiddle-neck leaves, stems and buds; lesser gilia capsules and bracts; wild onion seeds, grasshoppers and caterpillars. Chukars also took small amounts of green grass leaves.

Summer - During this season seeds of cheatgrass, rough fiddle-neck, and red-stem filaree were important. Animal food consisted primarily of grasshoppers.

Fall - Seeds of cheatgrass, rough fiddle-neck and red-stem filaree comprised the major portion of the diet.

Cheatgrass seeds and blades were consumed year-round and constituted the most important single plant food.

Galbreath (Reference #5) in Washington found seasonal food habits as follows:

Winter (Dec. 16 to Apr. 15) - 41 sample crops

cheatgrass seeds
grass leaves
pigweed seeds

Spring (Apr. 16 to June 15) - 31 sample crops

grass leaves
cheatgrass seeds
dandelion seeds and heads

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Summer (June 16 to Sept. 15) - 66 sample crops

cheatgrass seeds
serviceberry fruit
hawthorne pomes
fiddle-neck seeds
bunchgrass crowns

Fall (Sept. 16 to Dec. 15) - 78 sample crops

cheatgrass seeds
wheat
green matter

3. Water Requirements. Water has a great effect on the distribution of chukars, particularly during the summer. During hot, dry summers, birds are not regularly seen more than one mile from water. During winter, chukars utilize snow and succulent grass (on some ranges) and range widely throughout their habitat without being restricted to areas where water is available. A Utah study on pen reared chukars showed chukars could survive up to 80 days when fed dry food and deprived of water, but undoubtedly water is a very important factor of good habitat.

H. Limiting Factors.

1. Cover. The various cover components as described under cover requirements must be present to provide suitable habitat. The portions of the habitat usually found limiting chukar populations are described in the following sections. Considering all requirements of a chukar range, other than food and water, perhaps the primary requirement is rocky, steep terrain.

2. Food is seldom a limiting factor because chukars utilize a large variety of plant and animal materials. In addition to seeds, chukars use leaves, blades and bulbs of plants. Food becomes a limiting factor when it is not available because of heavy persistent snow cover over the chukars' range or during periods of prolonged drought.

3. Water. The availability of water is one limiting factor determining the extent of utilization of an area by chukars. The restriction of habitat use occurs primarily during the summer when chukars seldom range more than a mile or two from a water supply.

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4. Weather and Production. Condition of the range is a major factor in determining chukar production. During the winter and early spring months, chukars require green grasses for food and pre-breeding season conditioning. In arid areas inhabited by chukars the precipitation pattern and effectiveness has a direct bearing upon the annual food crop produced.

A three-year drought (1953-55) in Nevada caused a dramatic population decline and a decrease in production. Chukar production and populations made a quick recovery when "normal" precipitation patterns resulted in improved range conditions.

Heavy, long lasting snows in areas where the birds can't move to snow-free feeding areas can cause severe malnutrition and death. Chukars can survive very low temperatures as long as adequate food and cover is available. An extensive winter kill occurred during the winter of 1949-50 in Washington. This was a period of extreme cold and deep snow, and many (possibly a 65 to 75% loss) chukars died of malnutrition. Another die-off occurred in Washington during the winter of 1955-56 following deep persistent snow. Similar, perhaps less extensive, winter kills have occurred in other states, but chukar populations returned to higher levels within a few years.

5. Diseases and Parasites. Chukars are infected with various diseases and parasites as are all game birds, but no epidemics or major losses have been recorded in wild chukar populations in the U.S.

6. Predators. The effects of predation on chukars are not well known; in general, predation is more effective when prey populations are high and the losses to predators decrease as the prey population shrinks. Chukars are more susceptible to predation during the nesting season and when weakened by prolonged snow-covered range. Considering the rapid increase in both numbers and areas occupied by chukars, it must be assumed predation is not a major factor in regulating populations.

7. Fire. Chukars often inhabit areas where range fires are frequent. These fires can cause direct mortality, particularly to broods; however, the long-term effect is probably beneficial. Many important chukar food plants are species which invade burned-over areas.

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8. Hunting. Present information indicates regulated hunting has no serious effect on chukar populations. Early seasons when the birds are concentrated around limited water might result in over-harvest in local areas, but, in general, the rugged habitat tends to limit hunting pressure and success.

I. Management. The present rather limited knowledge of chukar requirements which can be manipulated by man restrict management to regulating hunting, transplanting and development of water sources.

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